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ORIGINAL ARTICLES.

TRANSPLANTATION OF SKIN IN PLASTIC OPERATIONS ON THE EYELID.[1]

BY WALTER B. JOHNSON, M.D., PATERSON, N. J.

The transplantation of skin flaps in plastic operations upon the eye-lid, by the method in vogue at present, is the result of a gradual development in the size of the portions of new tissue to be transplanted. The method of supplying new dermal tissues where loss of skin had resulted from accidents, burns or other causes, was originally introduced by Professor J. L. Reverdin, of Geneva, Switzerland, in the year 1869. It was called "skin grafting" and consisted in the application to granulating surfaces of very small portions of epidermis snipped from the skin of a living subject, care being taken that the dermis should not be included in the graft. The grafts were applied to the diseased surfaces and resulted in the formation of new cicatricial tissue, which was undoubtedly the product

[1]Read at the Forty-Sixth Annual Meeting of the American Medical Association, May, 1895. Section on Ophthalmology.

of the proliferation of the transplanted elements. Thiersch, Pollock, Bryant and others adopted the method, increasing the size of the grafts and including the cutis as well as the cuticle, believing that the proliferation occurred from the dermis as well as the epidermis. Fiddes reported cases in the *Lancet* of new tissue formation resulting from the proliferation of epidermal scales scraped from the skin by a long bistoury. The method rapidly came into general use; it is, however, only skin grafting, the implantation of a nucleus for the formation of cicatricial tissue and not transplantation of true skin.

The implantation upon granulating or fresh cut surfaces of large skin flaps from adjoining parts was introduced by Tagliacozzi many years before the possibility of skin grafting was thought of. He carefully dissected a portion of skin from a point near the surface to be covered, retaining at its base a pedicle through which the flap was to receive its nutrition. Modifications applicable to various locations were suggested by different operators. The procedures recommended for the plastic surgery about the eye-lids were not wholly satisfactory in consequence of the unsightly cicatrices at the point of removal of the flap, the thickening about the pedicle and the frequency of ulcerative processes intervening which resulted in still more serious deformity than existed prior to the operation.

In 1878, Mr. J. R. Wolfe, of Edinburgh, reported in the *London Medical Times and Gazette*, of June 3, a new method of "the transplantation of skin flaps from distant parts without pedicle." Following this, operations were successfully performed and reported by Wadsworth, Noyes, Aub, Mathewson, and others. The many advantages of the procedure led to its immediate adoption by ophthalmic surgeons. The object of the operation is the transplantation of healthy skin flaps to the required situation, the agglutination and healing by first intention, the permanent adhesion of the healthy new tissue at the point of implantation, and the relief of the existing deformity.

The skin selected for transplantation must, as nearly as may be, approximate the conditions and quality of the skin at

the location to which it is to be transplanted; an allowance of fully one-third must be made for shrinkage of the flap, all areolar tissue must be carefully removed, the flap must be dipped in tepid water and then thoroughly dried, the site of operation must be carefully prepared, and if the transplantation is to be made on the day of operation, all small blood clots and other detritus must be removed. In some cases it is desirable, especially if arteries have been tied, to allow an interval of two or three days to elapse between the time of the preparation of the wound and the application of the flap as sepsis may affect the flap if sloughing of any of the tissues occur. Before transplantation the granulating surface must be very carefully washed and dried; the prepared flap is then applied and gently pressed into position where it will adhere like sticking plaster. The wound is then dressed; no sutures are recommended although in many of the cases reported, catgut or other sutures have been used; sheet lint compress and bandage is applied and allowed to remain *in situ* for four days. Great care should be used in removing the dressing lest the flap be torn from its new adhesion by dragging. Goldbeater skin plaster is often used next to the flap.

The following case was operated successfully by the Wolfe method:

H. T., aged 3; colored. Applied at the Paterson Eye and Ear Infirmary for treatment, stating that six months ago he had received an injury of the right eye-brow from falling upon a stone step. The injury was followed by excessive swelling and subsequent inflammation. The family physician made an incision and a large quantity of pus was evacuated. The wound closed on two occasions and re-incision was necessary. Extensive destruction of the skin of the upper eye-lid resulted from ulceration which occurred during the stages of acute inflammation and was never at any time entirely healed. The contraction of the cicatricial tissue thus formed produced complete eversion of the upper eye-lid as shown in Plate No. 1.

August 2. Upon admission the child was in apparently good physical condition. There was eczema about the face

resulting from the excoriation of the ichorous discharges from the eye. The ectropion of the right upper eye-lid was so extensive that only about 3 lines separated the ciliary margin of the lid and the eye-brow. The everted palpebral conjunctiva was swollen, thickened and rough, bleeding upon the slightest touch. Almost all of the retrotarsal fold was exposed and it nearly concealed the eye-ball; there was a deep central ulcer of the cornea and a constant discharge of thick muco pus.

PLATE NO. 1.

The patient was ætherized and an incision made exposing the frontal bone which was diseased. The carious bone was removed and the wound dressed. After the opening closed the ulceration healed, the swelling of the lid decreased under proper diet and palliative medication. The cicatricial contraction resulted in an increased eversion of the lid.

September 25. The patient was again ætherized, and incision was made midway between the brow and the edge of the lid $1^{5}/_{8}''$ in length; the lid was carefully dissected, the at-

tachment of the cicatricial bands divided and the edge of the upper lid stitched to the lower. The result of this procedure was a large gaping wound $1^{5}/_{8}''$ in length and $^{7}/_{8}''$ in width in the median line. An elliptical incision was made on the inner side of the left thigh $2^{5}/_{8}''$ in length and $1^{2}/_{8}''$ in width at the largest diameter of the ellipse. The skin within the lines of the incision was carefully dissected from the leg and all areolar tissue removed. After preparation the flap measured nearly two inches in length and about one inch in width in its widest part. The flap and the wound were rendered aseptic; four fine catgut sutures were used to unite it to the edges of the wound, gold beater skin plaster was then placed over the new lid and the eye dressed with a compress bandage.

September 29. The dressings were removed, care being taken to prevent dragging upon the flap, the stitch uniting the eye-lids and the stitches from the end and center of the flap were carefully cut and drawn out. The transplanted skin flap seemed to have united in its new location although it presented a grayish appearance externally which looked like semi-transparent glass. The pigment deposit in the deeper layers was so dark that it appeared as if sloughing of the entire flap was imminent. There was no purulent discharge. The eye was dressed with plaster and bandaged as before.

October 2. The dressings were again removed and a thin gray membrane nearly the size of the flap came away with the plaster. This was at first believed to be the flap itself. On closer inspection, however, the entire surface of the new lid presented a peculiar appearance of semi-granulation points of reddish color. The excessive pigment deposit having materially lessened, a glazing which seemed to be the result of a deposit of thick viscid mucus indicated the formation of a new layer of epidermis. The dressings were re-applied.

October 4. The eye-lid when exposed disclosed the presence of a grayish membrane with commencing pigment spots which covered the entire field of the operation.

October 6. The membrane has assumed the appearance of newly-formed skin, the lid maintains its natural position;

there has been very little purulent discharge during the recovery. After this date the skin became more natural in appear-

PLATE NO. 2.

ance, softness and pliability. No unfavorable symptoms occurred. There was complete relief of the deformity. The eye-lid could, not, however, be elevated to the extent of that of the fellow eye. The accompanying plate No. 2 illustrates the condition six weeks after the treatment was discontinued.

REPORT OF A CASE OF MIND-BLINDNESS WITH AUTO-WORD-BLINDNESS.[1]

BY L. R. CULBERTSON, M.D., ZANESVILLE, OHIO.

Mr. P. C., aged 67 years, first came under the writer's observation two years ago, when he had an attack in which, while talking to his wife, a friend came in. He looked at him in a dazed manner but did not recognize him. His wife said, "that is Mr. H." He replied, "I know no Mr. H., I do not know him." The friend then said, "I am Mr. H., do you not know me?" He thought for some little time and then said "yes." The attack lasted nearly half an hour, at the end of which time he could recognize everybody. He had another attack a year later. Eighteen months after the first attack he had an attack of nervous prostration with excessive and constant flow of saliva—a symptom of cerebral softening—and a weak and fatty heart. He was kept alive five months by strychnine and atropine prescribed by Dr. C. M. Rambo, of this city. A month before his death acute meningitis or cerebritis developed, with insanity. The mind-blindness was then manifest in a modified form. He could recognize all his friends, but he was affected by a peculiar form of alexia or word-blindness, *i. e.*, he would write a sentence and in it there would be several words totally foreign to the subject of which he wrote. The words were usually spelled correctly and he could see them and read them with great difficulty, but he was not aware that he had used the wrong words. He could read letters of others and print and understand the sense perfectly, whether he read aloud or to himself. (He was fairly well educated and had been

[1]Read before the Muskingum County Medical Society.

a school teacher). "In ordinary alexia, according to Swanzy,[2] there is a loss of power of understanding printed or written speech-symbols and is held to be nothing more than a partial mind-blindness."

I have not been able to find a case on record, in which the patient could read printing and writing of others correctly and was not able to note the errors in his own writing.

A month before death hallucinations of hearing developed. As the case progressed symptoms of cerebral compression gradually developed, but there was no paralysis, except towards the last when there was the paralysis of general cerebral compression. A month before death I examined his eyes. The pupils reacted normally to light and accommodation. Ophthalmoscopic examination: R. E., shows optic neuritis and marked atrophic cupping of disc; veins greatly engorged and arteries much diminished in calibre; disc quite pale. L. E., neuritis less marked than in right eye, disc pale; veins enlarged. Visual field one-third concentrically restricted in both eyes. I did not test the color vision or color field. No scotomata or blind-spots. No hemianopsia. No ptosis or strabismus. No Charcot's disease or paralysis agitans, or locomotor ataxia. Knee-jerks normal. No post-mortem was made.

REMARRS.

Mind-blindness is often associated with color blindness, or with hemianopsia. One extremely interesting and novel feature of this case was his being able to see, read and understand the writing of others, but not being able to detect errors in his own writing. This would indicate that there must be not only a center for the visual memory of words written or printed by others separate and distinct from a visual center for words written by one's self. The reason for his writing the wrong words was that the cortical cells which should have sent out the impulse for the proper words were destroyed. These cells

[2]British Medical Journal, 1888.

are located in that portion of the brain which presides over reason known as conscious cerebration. The unconscious portion of the brain has its various centers connected by nerve fibres with the conscious or reasoning portion and refers all its ideas to the reason for decision before acting. Now, if the centers for these words in the reason are destroyed, then the unconscious portion can not get the aid of reason and will therefore suggest the wrong word.

Whether the lesion was the result of a small hemorrhage or embolism or simply of softening of a small spot of cortex, we can not tell, and could not tell unless the patient had died suddenly before acute symptoms set in.

The patient was right-handed. During the attacks, when the friend would speak to him, he would remember him for a few moments and then forget him, just as happened in cases which have been reported.[3] During these attacks he had great pain in his head and confusion of ideas and felt a great weakness.

On a number of occasions he was affected with the loss of visual memory for places so that he could not find his way home and had to be led home. On one occasion he saw a man on the street and he said there were three men, when in fact there was but one. This was due to hallucination of sight.

Another interesting symptom was that he could write figures but could not calculate sums. Also, on several occasions, in trying to read his own letters he could not succeed at all and had to have them read to him, but even then he could not see his grammatical errors.

The patient had only three attacks of the loss of visual memory for faces, the first several years ago and they always came on with symptoms of heart-failure so that it led me to suppose that there was softening beginning in the visual memory center, and the marked anæmia of this center caused by imperfect heart action made it suffer more than the other cortical centers.

[3]London Lancet, 1869, Vol. I, p. 363.

One remarkable feature of this case was the absence of scotomata, hemianopsia and hemiachromatopsia. Referring to the literature on the subject, Swanzy[4] reports a case in which there was mind-blindness with hemiachromatopsia and in which patient could not recognize his own wife until she spoke. In a case reported by Wernicke[5] the remarkable circumstance was noted that with good acuteness of vision, and without any absolute defect in the field, there were disseminated over a greater portion of the field, a number of relative scotomata or blind-spots, within the area of any one of which, although objects could be seen by the patient, yet he could not tell what they were. Color vision was not tested.

The position of the cortical center for visual memory is still a subject for discussion. Nothnagel, Wernicke and some other writers assign this function to all, or to most, of that part of the occipital cortex which does not form the center of vision. Gowers thinks that it is either in the anterior part of the occipital lobes or in the posterior part of the parietal lobes. Swanzy[6] says, "Judging by three cases of mind-blindness associated with hemianopsia, I think that the center for visual memory lies near the visual center, probably in the occipito-temporal lobe." Macewen[7] reports a case due to pressure from skull on which he operated and found that the symptoms were caused by pressure on the angular gyrus and supra-marginal convolution. Operation relieved these symptoms.

In alexia or word-blindness, Gowers, Wernicke, Wilbrand, Ferrier and Broadbent localize the lesion in the angular gyrus of the left hemisphere. Nothnagel,[8] while he localizes the center for visual speech-symbols in this same region, dissents from the view that word-blindness is to be included in mind-blindness; and the fact that in some well-marked cases of

[4]Transactions of the Ophthalmological Society of the United Kingdom, 1888.

[5]Loc. cit., Bd. III, p. 552.

[6]Trans. Oph. Society United Kingdom, 1888.

[7]Jour. Brit. Med. Association, 1888.

[8]Verhandlungen des VI Congress f. Innere Medicin zu Wiesbaden, 1887.

mind-blindness might seem to support this view.[9] But, if the center for visual memory of every kind, except that for printed or written speech-symbols, is situated in the occipital lobe as Nothnagel himself holds, there is no reason why word-blindness should accompany mind-blindness, unless in those cases in which the lesion extends to the angular gyrus.[10]

A good many cases of alexia with right hemianopsia have been recorded, and a natural explanation of this combination of symptoms is supplied by the proximity of the center for vision to the angular gyrus.

Dr. Borel[11] reports a case in which, in a right-handed person, word-blindness along with mind-blindness accompanied left hemianopsia; and Landolt[12] has placed on record a case of right hemiachromatopsia in which there was word-blindness.

A peculiar variety of alexia is reported by Brandenburg.[13] The patient who was affected with right homonymous hemianopsia, was unable to read any printed or written letters or words, yet he could read off with ease long numbers reaching to tens of thousands in Arabic characters.

The remarkable symptom termed dyslexia was first described by Berlin.[14] The patient is unable to read more than a very few words consecutively, either aloud or to himself, owing to a feeling of dislike or disgust which suddenly invades him, and which he cannot overcome. In every instance the lesion was on the left side of the brain, the patients being all right-handed. The disease seems to have occupied chiefly the inferior parietal lobule, extending sometimes as far forward as the inferior frontal convolutions, and sometimes as far backward as the angular gyrus.

In conclusion, I will state that as I can not find any similar case on record I will call this a case of auto-alexia, *i. e.*, unable to read understandingly the words written by self.

[9]Swanzy, in Brit. Med. Jour., 1888.
[10]Ibid.
[11]Landolt, loc. cit.
[12]Loc. cit.
[13]Loc. cit.
[14]Arch. f. Psych., Bd. XV, p. 276.

CONGENITAL RHABDO MYOMA OF THE ORBIT.

BY J. ELLIS JENNINGS, M.D., ST. LOUIS, MO.

On April 15, 1895, Mrs. H , a farmer's wife living about twenty miles from St. Louis, consulted Dr. S. Pollak about a swelling which existed just below the right eye of her fourteen-months-old boy. Dr. Pollak sent her to the eye clinic of the Mullanphy Hospital where we both made a careful examination of the case.

According to the mother's statement, she first noticed the small lump about six weeks previous and that it seemed to be getting larger.

The swelling or tumor was situated just below the right eye on a level with the orbital margin and to the nasal side of the median line. On first glancing at the child the swelling suggested a greatly distended lachrymal sac, but its position was below and to the right of the puncta and there was no indication of inflammation. The tumor was firm to the touch, could be moved over the edge of the orbital margin and appeared to extend backward into the orbit. The eyeball was displaced, to a considerable extent, outward, upward and forward. It was thought advisable to remove the growth at once and the operation was done April 18. The growth was loosely attached to the surrounding tissue and no difficulty was experienced in dissecting it out except at its inner extremity, where it was firmly attached in the region of the ethmoid bone. When removed, the tumor measured one inch in length and one-fourth of an inch in breadth. It was hardened in formol solution and sections stained with hæmatoxylin and methyl-blue. The microscopical structure of the tumor is as follows:

In a matrix of connective tissue are seen interlacing bundles of striated muscular fibres which are so abundant that they form the most striking and important tissue of the tumor. The muscular fibres are about one-third the thickness of skeleton muscular fibres and closely resemble those of a rhabdo-myoma of the kidney of a new-born child pictured in Fig. 45 of Formad's plates illustrating the histology of tumors (Lippincott & Co., 1883). The only difference is that in our case the muscular fibres have an increased numbers of nuclei and the connective tissue is filled with free nuclei and round cells. The connective tissue cells and the nuclei of the muscular fibres are deeply colored by the stain but the muscular fibres themselves remain unstained. A few blood vessels are observed which have enormously hypertrophied walls. Although fœtal tissue is very rich in nuclei, yet from the large quantity of round cells and free nuclei found in the connective tissue, the statement of the mother that the tumor was growing is undoubtedly correct. The only similar tumor mentioned in literature seems to be a leio-myoma described by Dr. Alt in his book on the Histology of the Eye, and I therefore think it of sufficient importance to place on record.

REVIEWS.

SKIASCOPY AND ITS PRACTICAL APPLICATION TO THE STUDY OF REFRACTION. By EDWARD JACKSON, A.M., M.D. 112 pages, with 26 illustrations. Philadelphia: Edwards & Docker Co. 1895. Price, $1.00.

An excellent exposé of the underlying optical principles and their practical application of skiascopy, in determining the refraction, written by a gentleman who has devoted especial time and study to this subject and has been one of its foremost advocates, this book must be very welcome to every student of ophthalmology. It is, besides, excellently printed and is singularly free from typographical errors, of which, in reading the book through, we have come only across a single one in the first paragraph.

LA PRATIQUE DES MALADIES DES YEUX DANS LES HOPITAUX DE PARIS. (The Treatment of Diseases of the Eye in the Hospitals of Paris). By PAUL LEFERT. Paris: J. B. Baillère et Fils. 1895.

This little volume is one of a series for the general practitioner. It gives the formulas usually employed in the treatment of eye diseases by forty-five Parisian oculists and may well be a help to those not well versed or daily engaged in the special practice. For convenience the subjects are alphabetically arranged.

A TREATISE ON THE NERVOUS DISEASES OF CHILDREN. By B. SACHS, M.D. 688 pages with 169 engravings and a colored plate. New York: William Wood & Co. 1895. Price, Muslin, $5.00.

As the title states, this book details particularly the nervous troubles found in children, while such forms of nervous diseases, as are more peculiar to adult age are omitted. The clinical pictures are clear and well drawn and a great deal of attention has been paid to the anatomy and pathological anatomy. This work may, therefore, be recommended as a welcome supplement, to other text-books on nervous diseases.

ALT.

SOCIETY PROCEEDINGS.

NEW YORK ACADEMY OF MEDICINE.

SECTION ON OPHTHALMOLOGY AND OTOLOGY.

May 20, 1895. JOSEPH A. ANDREWS, M.D., Chairman.

PYRAMIDAL CATARACT.

DR. STAFFORD.—I present this somewhat unique case to get the opinion of the members. The parents of the child assert that the anterior polar cataract was not perceptible before the time of the first convulsion, which occurred when the child was about two months old. It is now nine months old. It has had a few convulsions since then, but none lately. There is absolutely no sign of perforation of the cornea, and these opacities of the anterior capsule do not seem to extend into the lens substance, but project. I would like an opinion as to whether it is of the proliferating type, or simply a deposit of calcareous material. I also wish to know whether an operation is advisible, and if so, whether it should be discission, or a peripheral capsulotomy and destruction, or simply an opening into the anterior chamber and delivery of these opacities.

DR. WEBSTER.—It seems to be an ordinary case of capsular cataract. It would be a little extraordinary if such an opacity were noticed until there was something to call special attention to it in a baby less than two months old. I think any operative interference would be unjustifiable. With the ophthalmoscope there is seen a clear red reflex. I think these central opacities of the anterior capsule will interfere very lit-

tle with the vision. Of course, if it should take a course contrary to the usual one, and the child should develop cataract sufficient to interfere with the vision very seriously, that would be a different matter. In such a case, I think that I would "needle" until the lenses were absorbed, and then make an incision through the corneal margin, seize those opaque masses with delicate forceps, and pull them out with as much of the capsule as might come with them. I would not seize and pull them out before the needling.

DR. W. M. LESZYNSKY.—I can not conceive of the condition being the result of a convulsion in the child. It is the custom among the lower classes to raise the lid and open the child's eye; that might account for their having noticed it just at that time.

DR. E. GRUENING.—The opacity which we find here would very likely not interfere with the use of the eye, and it is certainly not justifiable to perform any operation. We can certainly not attribute the development of pyramidal cataract to the convulsion.

SARCOMA OF THE CHOROID.

DR. WEBSTER.—In this case there is a peculiar detachment of the retina. There is no waving of the retina on moving the eye. It is a rounded tumor, and yet it does not look exactly like other sarcomata of the choroid that I have seen. The vision is very much less than I should think it ought to be. The optic nerve, retina, and other parts look apparently healthy. It does not appear to interfere with the central vision and yet the vision is only $^{16}/_{c}$.

DR. JOHNSON.—This is certainly a most interesting case. There is undoubtedly elevation of the retina, and that elevation is certainly of such a character that it would seem to indicate the presence of a growth beneath it. There are changes on the temporal side of the growth—pigment spots and degenerative changes—which seem to me to indicate that there is some solid substance beneath. I do not think it is hardly pos-

sible for a sub-retinal fluid to be so extremely tense that there should not be the slightest movement or fluctuation in the growth.

DR. H. H. SEABROOK.—I think the vascularization is very suspicious. I saw, deep in the upper part of the growth, a few small vessels, which can not be traced into the retinal vessels.

DR. WILBUR B. MARPLE.—There is a reddish-white reflex observed, with a strong convex lens, and one can distinguish the vessels apparently quite independent of the retinal vessels.

DR. GRUENING.—I am inclined to think that we have to deal here with a neoplasm. The appearance of detachment in the emmetropic eye, without injury, is very rare I examined both eyes without knowing which one was affected, and I found that the sound eye was softer to the touch. However, the personal equation comes into play here, and the other examiners may not agree with me. Again, the region is one where the retina does not readily become detached, and it is absolutely essential that there should be something to push the retina forward. Moreover, there is absolutely no wave. It is a globular mass such as I saw recently in a case of tumor of the choroid springing from the muscular origin. There also the detachment did not ocour at a very early period. The retina was in contact with the mass, and I could diagnosticate the tumor, when it was not larger than a split plea. I saw, however, the vessels distinctly belonging to the mass. It was a leuco-sarcoma, and therefore the vessels could be seen. In melano-sarcoma the vessels are not seen. I think that there is a layer of fluid between the mass and the retina, because there is a certain transparency, and a red reflex from the deeper parts. If this be a sarcoma, the eye should be promptly removed, whereas if the retina were detached, this would not be the proper treatment. I would favor, therefore, an exploratory operation.

A HIGH DEGREE OF HYPERMETROPIA.

DR. WILBUR B. MARPLE.—I have never seen before a

hypermetropia of more than eight diopters, but this boy has at least fourteen diopters.

DR. WEBSTER.—It is true that these cases of high degree of hypermetropia are rare, but I think I have seen cases of even higher degree. I have seen at least two cases in the last twenty years where the patient, in order to read, slid the print along his nose, so that his nose was constantly blackened by the printer's ink. The degree was measured by the ophthalmoscope.

DR. GRUENING.—I have never seen before a case of more than nine diopters of hypermetropia.

DR. MARPLE.—The sight is improved slightly by glasses. He is able to read with a strong convex lens, and can not read at all without it.

DR. SEABROOK.—A case of twenty-four diopters has long been on record. I have records of some thousand cases, yet in none of them did the hypermetropia exceed eleven diopters.

SUGGESTIONS REGARDING LEGISLATION FOR THE PREVENTION OF BLINDNESS.

DR. W. B. JOHNSON.—In a carefully prepared paper, read at the November meeting of the Medical Society of the County of New York, Dr. Charles H. May tabulated all the diseases of the eye for eight years, treated in an eye and ear institution in New York City. In 1888, 1889, and 1890 there were 76,366 cases of eye disease treated, of which 452 were ophthalmia neonatorum—5.92 per thousand—while in the same institution during 1891, 1892, and 1893, 97,493 cases were treated, of which 488 were ophthalmia neonatorum—5 per thousand. The decrease in the number of cases of ophthalmia neonatorum is less than one case per thousand of the eye diseases treated. On June 26, 1892, at a meeting of the New Jersey Medical Society, a committee reported the draft of an act to be recommended to the next Legislature regarding the care of infants suffering from communicable eye diseases. On February 4, 1895, an act was introduced in the State of New Jersey for the preven-

tion of blindness. "Should one or both eyes of an infant be inflamed, swollen, or reddened, or show any unnatural discharge after birth, the midwife, nurse, or relatives shall report the fact in writing within six hours to the local board of health, if there is no physician in attendance; and the board of health shall place the case in charge of a local qualified practitioner of medicine." The act seems to have overcome most of the objections against similar acts in other States. It passed both houses, and became a law on March 12, 1895. It compels the immediate placing of the infant under the care of a local practioner. Copies of the act are sent to every nurse and midwife in the State.

The question of the advisibility of placing the disease ophthalmia neonatorum upon the board of health's list of infectious diseases was favorably considered by the committee. In the opinion of the writer, the reporting of all cases of ophthalmia neonatorum to local boards of health should be compulsory.

DR. HENRY W. RING, of New Haven.—I have been especially interested in this particular subject. A similar law was recently passed in Connecticut, and I thought then it was the best law up to date; the New Jersey law, however, seems to be still better. The statistics prepared by Dr. May were very valuable to many of us, and he deserves a good deal of credit,

DR. CHARLES H. MAY.—I think that the law, as passed in New Jersey, is an excellent one, and I expect to borrow its phraseology in my attempt to have an improved New York State law passed. One very valuable part of the New Jersey law is the provision for distribution of copies of the law among practitioners, nurses, and midwives. In New York City, the majority of general practitioners, and probably half of the oculists have a very indefinite knowledge of the provisions of the present New York State law.

DR. GRUENING.—This law will probably be inoperative, because in many country towns there are no local boards of health.

DR. JOHNSON.—In the country places they do not have

ophthalmia neonatorum. In the city gonorrhœa is easily contracted. In New Hampshire, where I spend a part of the summer, I have never seen or heard of a case. The more populous townships in New Jersey have local boards of health. I think all our efforts should be directed toward placing the disease upon the infectious and contagious diseases lists of the boards of health. These boards will then be interested in having it reported.

ACCOMMODATION IN OLD PEOPLE.

DR. H. H. SEABROOK.—I propose to give in detail a number of clinical records. These uncomplicated cases will be sufficient, I think, to demonstrate that accommodation does not disappear in old people. Indeed, I see no reason why it should do so, as the ciliary muscle in old persons is not absolutely powerless and the cortical fibers or the lens retain their elasticity. A safe deduction from these cases would be that the near point recedes progressively, but irregularly, as age advances.

DR. JUSTIN L. BARNES.—I have noted, in a great many cases of presbyopia, that the glass which I finally ordered for a patient was considerably weaker than was supposed to be called for by the table of accommodation, or presbyopia correction for a given age. Several years ago, when ophthalmology was newer to me than now, I asked a prominent ophthalmologist in this town what that signified. He said it implied approaching dissolution. When I saw my next case and gave a glass that was half as many diopters as strong as was supposed to be indicated, I took a note of that patient, and watched for the death notice in the papers. That patient is still alive. I should like to ask if the notion that approaching death is indicated, has any foundation in fact.

DR. WEBSTER.—I never heard of that notion before. We all know of the refraction changes in old people, and that sometimes they require weaker glasses than they have been using. Such cases belong in the same category with those of

"second sight," where there is atrophy of the periphery of the lens, and perhaps increase in the index of refraction, and where the eye becomes to a certain extent myopic. By just so much it requires a weaker glass for reading. I do not think that any one could have practiced ophthalmology in this city ten or fifteen years without coming to the conclusions reached by the reader of the paper. The Donders lines are altogether schematic. The age in a general way has something to do with the amount of presbyopia. The older a man is, the stronger the glass he takes, and, as a rule, the lens is his accommodation, but this rule is subject to great variations.

DR. SEABROOK.—These cases I find very difficult of explanation—these hypermetropes who have no accommodation for distance, and still can accommodate for reading. The only hint at an explanation is that when the pupil is contracted, the refraction is far higher at the center of the lens than at the sides; but that seems to me a somewhat lame explanation. The explanation given for so-called "second sight" is also unsatisfactory.—*American Medico-Surgical Bulletin.*

SELECTIONS.

STRABISMUS AS A SYMPTOM, ITS CAUSES AND ITS PRACTICAL MANAGEMENT.[1]

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Landolt in his classical work says: "A strabismus operation, when undertaken without an exact knowledge of the optical and muscular functions of the eye, is but a rude and dangerous experiment." The reason for this statement springs from the fact that strabismus is merely a symptom of numerous pathologic and congenital defects, and its rational management calls for the study and removal, or correctness of these, so far as is practicable. The story of strabismus well illustrates the persistency by which the profession traces a symptom to its origin, in order that its cause may be removed and the symptom cured. Failure of squint operations has led to such a study as revealed the reasons for the past defects and the methods for future success.

At present we know that some cases of squint are readily curable, that some are incurable, and others doubtful, calling for additional study ere they can be classed either as curable or incurable. Diefenbach operated first for convergent squint in 1839, by dividing the belly of the internal rectus muscle. His operation was based upon the analogy of operations upon contracted muscles in other portions of the body. He reasoned, that since division of contracted muscles or tendons

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elsewhere, restored muscular equilibrium, it should do so in the ocular muscles. He neglected to note that the problem of contracted ocular muscles differed radically from that presented elsewhere, in that opposing recti and their associated elastic tissues constantly tended to separate their divided ends. Hence the results obtained by himself and others were so frequently disappointing and actually disastrous that, except for the radical change introduced by Bœhm, the operation must have passed into merited oblivion. This transferred the site of the operation from the belly of the muscle to its tendinous insertion, thus leaving the capsule of Tenon mainly undisturbed. The technique of the operation was so perfected by von Graefe as to render it easy and safe of performance; especially useful was his method for either increasing the effects of a tenotomy or diminishing the same.

The ophthalmoscope enabled us to see that some cases of squint were due to diseases of the refractive portions of the eye, distorting the passage of the rays of light in their course to and from the retina, or in case of disease of the optic nerve, cutting off the power of transmitting the impression made by the rays of light upon the retina, to the brain.

Not a few cases were traced to corneal opacities. Eyes entirely blind were found to often squint. Thus the symptom squint was traced to a variety of pathologic conditions, having one common feature, viz., they rendered the vision of the two eyes unequal and so deprived them of the 'guiding sensation." With these facts in mind it is clear that a squint operation, without previous careful ophthalmoscopic examination, must be "a rude and dangerous experiment."

Donders' studies of refraction and accommodation traced this symptom to other and more common sources. Thus he showed that three-fourths of the cases of convergent squint were hyperopic, and an equal proportion of the cases of divergent squint were myopic. He also pointed out the intimate relationship between convergence and accommodation, a physiologic fact which anatomic researches have supported, by demonstrating the close relation of their centers in the floor of

the fourth ventricle. When the eyes accommodate for near objects by the contraction of the ciliary muscle, they also converge by the contraction of the internal recti. The bearing of this fact upon the causation of squint is apparent, when it is remembered that the hyperope is compelled to accommodate at all distances, and so the ciliary muscles are in a state of constant tension, and with them the internal recti. The flattened eyeball of the hyperope has broken the harmony which should exist between convergence and accommodation. Thus, if the hyperope accommodate for twelve inches, as in reading, the convergence will be at a point less than twelve inches if the muscles are of normal power. The result is a diffusion of impressions upon the retinæ, to escape which the squinting hyperope turns one eye in and fixes the other at twelve inches, ignoring the impression of the squinting eye. A repetition of such acts forms a squint habit, which, while at first alternating, at last usually becomes fixed. The habitual suppression of the image in the squinting eye is followed by a loss of the power of perception—a loss which can be repaired if the retinæ be normal at the first. Thus we have convergent squint due to eyes defective in the length of their antero-posterior axis. To the query, Why all hyperopes do not squint, it is replied that in those who do not squint, the normal balance between the power of the internal and external recti is so changed that, instead of being 4 to 1 it is less, only 2 to 1 or even 1 to 1. Hence in the non-squinting hyperopes, the excessive convergence required for distinct vision is balanced by the weak interni, so that the eyes remain straight. If the externi be much in excess of the interni, we have a hyperope with divergent squint. In support of this view of the causation of squint, advanced by Valk, I have habitually found all hyperopes to have weakened interni, as measured by the standard of 4 to 1.

Donders found that myopes needed little or no accommodation, because the eyeballs were already too long; hence the convergence in near seeing would be *nil*, and so if the strength of the recti was normal, the eyes would turn outward and give

a divergent squint. But if the externi were weak the eyes might remain straight, or if very weak they might turn in and give a convergent squint. Aside from muscular action in causing divergent squint in myopes, we have the elongated antero-posterior shape of the eyeball; the greater distance between the temples of myopes; variations of the orbital fat, and of the attachments of the ocular muscles to the bony walls.

These studies in refraction, accommodation and action of the external muscles of the eyes have led to far reaching consequences in the management of the symptom of squint. Thus it has been shown that some cases of convergent squint can be permanently cured by the wearing of such convex glasses as fully correct the abnormal flatness of the eyeballs; that some cases of divergent squint can be cured by the wearing of concave glasses, which reduce the refractive power of the eyes to their normal standard. The symptom disappears when we have restored the lost equilibrium between the refraction, ciliary and recti muscles.

As the nature of mydriatics became understood, it was found that their use in paralyzing the accommodation, permitted the recti to assume their normal functions, and so facilitated a cure of cases in which the squint persisted after the defects of refraction had been corrected by appropriate glasses.

Statistics on a large scale, show that while tenotomies and advancements cured many cases of squint, the intelligent correction of refractive defects and the use of mydriatics cured many additional cases, added to the number of those who secured binocular vision and diminished the number of divergent squints following tenotomies. Thus by distinct lines of evidence we have traced the symptom squint, in many cases to defects of refraction, and abnormal ocular muscles. This result is still further confirmed by recent studies of those similar disturbances of muscular equilibrium known as insufficiencies or heterophorias. These studies have encouraged surgeons to seek binocular vision in the management of squint, rather than rest content with the straightening of the eyes, because they have given us finer and more precise methods of operat-

ing and more suitable instruments, both for determining the muscular disability and for doing the operations; in short, they have furnished us with a micrometer adjustment for the doing of squint operations, and so raised them to a higher perfection.

Finally, squint has been traced to a defective structure of the retinal percipient elements, congenital in its origin, unchangeable in character, and causing an inability to see other than large objects. Upon these eyes, neither glasses, atropin, or tenotomies have other than a cosmetic effect; only operative procedures avail aught in their management.

Having collected all existing knowledge respecting squint, we see still vast fields, uncultivated fields adequate for the surplus energies of more than a generation of physicians. Thus we want a comparative study of the origins and insertions and other relations of the ocular muscles; the modifications of their activities by the varied shapes and sizes of the eyeballs, by the individual peculiarities of the capsule of Tenon, by the quantity and quality of the orbital fat or the fibrous stroma which holds it in place. We want a comparative study of the orbital walls, as bearing upon their contents, and the functional activities of the eyes. We have still much to learn of the nervous apparatus of the eye and its muscles, of its visual and motor centers, and of the complex relationship of this apparatus to other organs; in fact, time fails us to even enumerate the fields awaiting investigation, in their relation to the causation and management of squint. However, our present knowledge enables us to attain very satisfactory results in an increasing number of cases. It is a marked advance in that we aim, not only to straighten eyes, but to have the patient possess binocular vision. This is attained by supplementing the operations for squint with gymnastic exercises, innervation treatment or partial tenotomies, until we have enabled the eyes to fix upon any point in the visual field. This necessitates a cordial cooperation of physician and patient during an extended period, varying with individual cases.

For convenience the management of squint may be divided into operative and non-operative. The operative

measures are tenotomies of the stronger muscles or advancement of the weaker ones; both of which may be needed in the same case.

The non-operative means are:

1. Careful attention to the patient's constitutional condition.

2. The correction of all defects of refraction, so far as these affect the squint unfavorably—the correction to be made from data obtained while the eyes are fully under the influence of atropin.

3. The continued use of mydriatics.

4. The use of gymnastic exercises, or the innervation treatment of Gould, to increase the power of the weaker muscles, or to bring them into operation with the stronger.

In each case the surgeon is met with the question, Is this an operable one? To aid in answering this, I give brief extracts of four typical cases, whose condition I was able to record many years after the treatment—affording the final results of the management of convergent squint:

CASE I.—Boy aged 5, strong, with marked convergent squint of the left eye, noticed when six months old. An examination with the ophthalmoscope showed healthy ocular media; vision of right eye was $^{20}/_{XX}$; of the left $^{20}/_{CC}$. Under a mydriatic the ophthalmoscope showed a hyperopia of a dioptric and a half. The full correction of this was prescribed, and the ciliary muscles kept fully under the influence of atropin, but at the end of six months the result was negative. The internal rectus tendon was now divided and the other treatment continued, with the final result of leaving the eyes perfectly straight, but with no improvement of vision even fifteen years after the tenotomy. This was clearly an operable case, as nothing but the tenotomy changed the squint, and even it failed to improve the vision. Such cases are defective in the precipient elements of the retina of the squinting eye, or its optic nerve relations.

CASE II.—A healthy girl aged 9; convergent squint of right eye since one year old, at first alternating but finally fixing; the ophthalmoscope showed perfectly healthy media, in both eyes, and a hyperopia of two dioptrics in the right eye and one and a half in the left; vision of right eye was $^{20}/_{CC}$; of left eye $^{20}/_{XL}$. Full mydriasis and correction of hyperopia failed to benefit the squint, so that a tenotomy of the right internal rectus tendon was done. This failing, a month later the left internal rectus tendon was divided, with the result of making the eyes practically straight and after many months bringing the vision of each eye to $^{20}/_{XX}$. These two cases were alike in both requiring ocular tenotomy, but unlike in that the vision of the first was unimproved, while that of the second became normal, though the same methods were employed. The first represents a class of cases, congenitally defective in the precipient elements of one eye and so incapable of development; the second stands for a class in which vision is lost by non-use, but can be restored if the eye can be placed in such relations as will admit of the normal exercise of the retinal elements.

CASE III,—Boy aged 5; squint noticed when two years old; alternating then and at examination; vision of each eye $^{20}/_{XL}$; hyperopia two dioptrics, the correction of which gave a vision of $^{20}/_{XX}$, and rendered the eyes perfectly straight. Atropin was used six months and the correcting glasses worn constantly with the result that ten years later the eyes were straight and the vision binocular and normal.

CASE IV.—Boy aged 8; convergent squint of the left eye, noticed when a year and a half old as alternating but now fully fixed; ophthalmoscope revealed perfectly clear media, and a hyperopia in the right eye of two dioptrics, and in the left of two and a half; vision of right eye $^{20}/_{XXX}$; of the left $^{20}/_{C}$. Glasses correcting the hyperopia, both straightened the eyes and substantially improved the vision of the fixed eye. This improvement continued till vision of the squinting eye was equal to

that of the other, and nine years later the vision continued normal and the eyes were perfectly straight.

The last two cases were clearly non-operable. True, a tenotomy would have rendered the eyes straight, but later they would have diverged.

To avoid complexity, simple hyperopic cases are selected, but cases of hyperopic astigmatism, simple or complicated with hyperopia obey the same laws.

It follows that in every case of uncomplicated squint, the question arises, Does it belong to the class of congenital amblyopias or not? If the answer be affirmative, the case can be operated upon at once for cosmetic effect—there being no hope of improving vision. If the answer be negative, we must separate the operable from the other cases. The following has been found a safe method of procedure:

1. Eliminate all cases of paralysis.

2. With the ophthalmoscope, detect all squints due to opacities in the refracting media and treat them by operations, as in congenital amblyopias, for cosmetic effect merely.

3. Determine the vision of each eye, and the kind and degree of ametropia under mydriasis.

4. Correct the full amount of ametropia, and if this renders the eyes nearly or quite straight, an operation is inadmissible and the cases will probably go on to full recovery, under the use of glasses and atropia.

5. If glasses and atropin produce no perceptible effect upon the squint, then a tenotomy of one or both recti is indicated, followed by the use of glasses to relieve the eye strain and retain the eyes in the position resulting from the operation. The securing of binocular vision in this class of cases is materially aided by gymnastic training of the weaker muscles, and the co-operation of all.

6. The time for operating upon convergent squint depends entirely upon the ability of the surgeon to separate the

operable from the non-operable cases. An operable case is best treated as early as the co-operation of the patient can be assured—usually at about 6 years.

7. If glasses correcting the full ametropia be worn at an early date, the normal relations of convergence and accommotion are soon established, better developed during child growth, and the ultimate vision more perfect.

8. To secure the best results, calls for much attention to the management of these cases, during a period extending over months or even years.

9. As to the final balance of the internal to the external recti, a proportion of 4 to 1 has given the greatest comfort to patients, and the best vision under all circumstances.

CONCLUSIONS.

1. Strabismus is always a symptom of some morbid or congenital defect.

2. Success in its relief, has increased in direct proportion to our knowledge of these conditions and defects.

3. Strabismus due to opacities of the refracting media or to congenital amblyopia, can only be treated by operations, and solely for cosmetic effect.

4. Strabismus due to the combined action of hyperopia and normal recti, is treated by tenotomy or advancement, atropin mydriasis, suitable glasses and gymnastic or innervation exercises.

5. Binocular vision is to be sought for in all cases other than those due to opacities of the refracting media, congenital amblyopia or organic disease of the retina or optic nerve. With sufficient perseverance, it is attainable in a fair proportion of cases.

6. Recent studies of heterophorias afford substantial aid in the better management of squint, by the new standards of

both operative and gymnastic work, by the more convenient and reliable instruments for examination, and finer ones for operation.

7. There yet remain a number of cases of squint not explicable by our present knowledge, or amenable to treatment by accepted methods. To bring these under definite law, both as to cause and management, remains for the student of ophthalmology.—*Journal of the American Medical Association.*